Notice of Allowability	Application No.	Applicant(s)	
	09/755,763	WILLIAMS ET AL.	
	Examiner	Art Unit	
	Vikkram Bali	2623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *8/19/2004*.

2. ☒ The allowed claim(s) is/are *1-8, 19-35, 38-45, 73-77, 81, 85-90, and 97-122, (renumbered as 1-71)*.

3. ☒ The drawings filed on *05 January 2001* are accepted by the Examiner.

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Anna M. Vradenburgh, #39,868 on 1/31/2005.

The application has been amended as follows:

In claims:

1. A device for writing and processing handwriting comprising:

a body;

a marking element for making strokes comprising a character on a surface, the marking element being coupled to the body;

a detector for detecting each stroke on the surface, and

a processor coupled to the detector, wherein the detector and processor are disposed within the body; and

wherein the detector comprises:

an array that includes at least one photo emitter and at least one photo detector;

wherein at least one photo emitter emits light towards the marking element to illuminate the strokes; and

wherein at least one photo detector (a) has a field of view that includes the marking element, (b) detects the strokes using the light reflected off the surface, (c) converts the

detected strokes into electronic signals, and (d) sends the electronic signals to the processor; and

wherein the array is in the shape of a ring, with the center of the ring perpendicular to a z-axis that passes through a center of the marking element and is parallel to a major axis of the device.

2. The device according to claim 1, further comprising an active feed-back mechanism, wherein the detector detects the strokes at a periodic rate which is adjusted based on input from the active feedback-mechanism.

3. The device of claim 1, wherein the processor identifies the character by combining the recognized strokes of the character and comparing the combined recognized strokes with a reference set of combined recognized strokes.

4. The device of claim 3, wherein the processor is comprised of a first sub-processor for characterizing each detected stroke as one in a set of reference strokes, and a second sub-processor for identifying the character, the first and second sub-processors functioning asynchronously.

5. The device of claim 1, wherein the processor characterizes each detected stroke as one in a set of reference strokes by representing each detected stroke as a polynomial representation, comparing the polynomial representation of each detected stroke with

polynomial representations as of the reference strokes, and selecting for each detected stroke a reference stroke whose polynomial representation is sufficiently similar to the polynomial representation of the detected stroke.

6. The device of claim 1, wherein the processor characterizes each detected stroke as one in a set of reference strokes by representing each detected stroke as a vector representation, comparing the vector representation of each detected stroke with vector representations of the reference strokes, and selecting for each detected stroke a reference stroke whose vector representation is sufficiently similar to the vector representation of the detected stroke.

7. The device of claim 1 further comprising a character output mechanism for outputting a signal representing the character.

8. The device of claim 1, wherein the detector detects the strokes in the temporal order that the strokes are made.

9. (Cancelled)

10. (Cancelled)

11. (Cancelled)

12. (Cancelled)

13. (Cancelled)

14. (Cancelled)

15. (Cancelled)

16. (Cancelled)

17. (Cancelled)

18. (Cancelled)

19. A device for writing and processing handwriting comprising:

a body;

a marking element for making strokes comprising a character on a surface, the marking element being coupled to the body;

a detector for detecting each stroke on the surface, and

a processor coupled to the detector, wherein the detector and processor are disposed within the body, wherein the detector comprises:

a photo emitter mounted on a first side of the device, wherein said photo emitter emits light towards the marking element to illuminate the strokes;

a first photo detector mounted on a second side of the device, wherein said first photo detector (a) has a first field of view that includes the marking element, (b) detects the strokes using the light reflected off the surface, (c) converts the detected strokes into electronic signals, and (d) sends the electronic signals to the processor; and

a second photo detector mounted on a third side of the device, wherein said second photo detector (a) has a second field of view that includes the marking element, (b) detects the strokes using the light reflected off the surface, (c) converts the detected strokes into electronic signals, and (d) sends the electronic signals to the processor.

20. The device according to claim 19, wherein the second side is opposite the third side.

21. The device according to claim 19, wherein the photo emitter, the first photo detector, and the second photo detector are mounted adjacent to the marking element.

22. The device according to claim 19, wherein the first photo detector and the second photo detector detect the strokes at a periodic rate which is adjusted based on input from an active feedback mechanism.

23. The device according to claim 19, wherein the light, the first field of view, and the second field of view are approximately centered upon the marking element.

24. The device according to claim 19, wherein the first field of view overlaps the second field of view.

25. The device according to claim 19, wherein the photo emitter emits constant light and the first photo detector and the second photo detector detect diffusely reflected light.

26. The device according to claim 19, wherein the photo emitter emits pulsed light and the first photo detector and the second photo detector detect spectrally reflected light.

27. A device for writing and processing handwriting comprising:

a body;

a marking element for making strokes comprising a character on a surface, the marking element being coupled to the body;

a detector for detecting each stroke on the surface, and

a processor coupled to the detector, wherein the detector and processor are disposed within the body, wherein the detector comprises:

a multi-segment photo emitter mounted on the device, wherein said multi-segment photo emitter emits light towards the marking element to illuminate the strokes;

a first photo detector mounted on a first side of the device, wherein said first photo detector (a) has a first field of view that includes the marking element, (b) detects the strokes using the light reflected off the surface, (c) converts the detected strokes into electronic signals, and (d) sends the electronic signals to the processor; and

a second photo detector mounted on a second side of the device, wherein said second photo detector (a) has a second field of view that includes the marking element, (b) detects the strokes using the light reflected off the surface, (c) converts the detected strokes into electronic signals, and (d) sends the electronic signals to the processor.

28. The device according to claim 27, wherein the multi-segment photo emitter is in the shape of a ring, with the center of the ring perpendicular to a z-axis that passes through a center of the marking element and is parallel to a major axis of the device.

29. The device according to claim 27, wherein the first side is opposite the second side.

30. The device according to claim 27, wherein the multi-segment photo emitter, the first photo detector, and the second photo detector are mounted adjacent to the marking element.

31. The device according to claim 27, wherein the first photo detector and the second photo detector detect the strokes at a periodic rate which is adjusted based on input from an active feedback mechanism.

32. The device according to claim 27, wherein the light, the first field of view, and the second field of view are approximately centered upon the marking element.

33. The device according the claim 27, wherein the first field of view overlaps the second field of view.

34. The device according to claim 27, wherein the multi-segment photo emitter emits constant light and the first photo detector and the second photo detector detect diffusely reflected light.

35. The device according to claim 27, wherein the multi-segment photo emitters emits pulsed light and the first photo detector and the second photo detector detect spectrally reflected light.

36. (Cancelled)

37. (Cancelled)

38. The device according to claim 1, wherein the array contains a plurality of elements, each element being either a photo emitter or a photo detector.

39. The device according to claim 38, wherein each element is equally spaced within the array.

40. The device according to claim 1, wherein the array is mounted adjacent to the marking element.

41. The device according to claim 1, wherein at least one photo detector detects the strokes at a periodic rate which is adjusted based on input from an active feedback mechanism.

42. The device according to claim 1, wherein the light and the field of view are approximately centered upon the marking element.

43. The device according to claim 1, wherein each field of view overlaps at least one other field of view.

44. The device according to claim 1, wherein at least one photo emitter emits constant light and at least one photo detector detects diffusely reflected light.

45. The device according to claim 1, wherein at least one photo emitter emits pulsed light and at least one photo detector detects spectrally reflected light.

46. (Cancelled)

47. (Cancelled)

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67. (Cancelled)

68. (Cancelled)

69. (Cancelled)

70. (Cancelled)

71. (Cancelled)

72. (Cancelled)

73. The device according to claim 1, wherein the detector detects quadrature elements using a feed-forward and feed-backward mechanism.

74. The device of claim 1, wherein the processor identifies the character by combining recognized quadrature elements of the character and comparing the combined recognized quadrature elements with a reference set of quadrature data.

75. The device of claim 1, wherein the processor identifies the character by comparing a recognized quadrature element with a reference set of quadrature data.

76. The device of claim 3, wherein the processor comprises a first processor for characterizing each detected stroke as a quadrature element using a set of reference

quadrature elements, and a second processor for identifying the character, the first and second processor functioning asynchronously.

77. The device of claim 1, wherein the processor characterizes each detected stroke as a quadrature element as one in a set of reference quadrature elements by representing each detected stroke as a quadrature element selected from the group consisting of: a basis vector, eigenvector, polynomial, Fast Fourier Transform function, and a combination of vector data and function translations.

78. (Cancelled)

79. (Cancelled)

80. (Cancelled)

81. The device of claim 1 further comprising a character storage mechanism for storing a signal representing the character.

82. (Cancelled)

83. (Cancelled)

84. (Cancelled)

85. The device according to claim 19, wherein the photo emitter emits constant light and the first photo detector and the second photo detector detect spectrally reflected light.

86. The device according to claim 19, wherein the photo emitter emits pulsed light and the first photo detector and the second photo detector detect diffusely reflected light.

87. The device according to claim 27, wherein the multi-segment photo emitter emits constant light and the first photo detector and the second photo detector detect spectrally reflected light.

88. The device according to claim 27, wherein the multi-segment photo emitters emits pulsed light and the first photo detector and the second photo detector detect diffusely reflected light.

89. The device according to claim ~~36~~1, wherein at least one photo emitter emits constant light and at least one photo detector detects spectrally reflected light.

90. The device according to claim ~~36~~1, wherein at least one photo emitter emits pulsed light and at least one photo detector detects diffusely reflected light.

91. (Cancelled)

92. (Cancelled)

93. (Cancelled)

94. (Cancelled)

95. (Cancelled)

96. (Cancelled)

97. The device according to claim 19, further comprising an active feed-back mechanism, wherein the detector detects the strokes at a periodic rate which is adjusted based on input from the active feedback-mechanism.

98. The device according to claim 27, further comprising an active feed-back mechanism, wherein the detector detects the strokes at a periodic rate which is adjusted based on input from the active feedback-mechanism.

99. The device of claim 19, wherein the processor identifies the character by combining the recognized strokes of the character and comparing the combined recognized strokes with a reference set of combined recognized strokes.

100. The device of claim 27, wherein the processor identifies the character by combining the recognized strokes of the character and comparing the combined recognized strokes with a reference set of combined recognized strokes.

101. The device of claim 99, wherein the processor is comprised of a first sub-processor for characterizing each detected stroke as one in a set of reference strokes, and

a second sub-processor for identifying the character, the first and second sub-processors functioning asynchronously.

102. The device of claim 100, wherein the processor is comprised of a first sub-processor for characterizing each detected stroke as one in a set of reference strokes, and

a second sub-processor for identifying the character, the first and second sub-processors functioning asynchronously.

103. The device of claim 19, wherein the processor characterizes each detected stroke as one in a set of reference strokes by representing each detected stroke as a

polynomial representation, comparing the polynomial representation of each detected stroke with polynomial representations as of the reference strokes, and selecting for each detected stroke a reference stroke whose polynomial representation is sufficiently similar to the polynomial representation of the detected stroke.

104. The device of claim 27, wherein the processor characterizes each detected stroke as one in a set of reference strokes by representing each detected stroke as a polynomial representation, comparing the polynomial representation of each detected stroke with polynomial representations as of the reference strokes, and selecting for each detected stroke a reference stroke whose polynomial representation is sufficiently similar to the polynomial representation of the detected stroke.

105. The device of claim 19, wherein the processor characterizes each detected stroke as one in a set of reference strokes by representing each detected stroke as a vector representation, comparing the vector representation of each detected stroke with vector representations of the reference strokes, and selecting for each detected stroke a reference stroke whose vector representation is sufficiently similar to the vector representation of the detected stroke.

106. The device of claim 27, wherein the processor characterizes each detected stroke as one in a set of reference strokes by representing each detected stroke as a vector representation, comparing the vector representation of each detected stroke with vector

representations of the reference strokes, and selecting for each detected stroke a reference stroke whose vector representation is sufficiently similar to the vector representation of the detected stroke.

107. The device of claim 19 further comprising a character output mechanism for outputting a signal representing the character.

108. The device of claim 27 further comprising a character output mechanism for outputting a signal representing the character.

109. The device of claim 19, wherein the detector detects the strokes in the temporal order that the strokes are made.

110. The device of claim 27, wherein the detector detects the strokes in the temporal order that the strokes are made.

111. The device according to claim 19, wherein the detector detects quadrature elements using a feed-forward and feed-backward mechanism.

112. The device according to claim 27, wherein the detector detects quadrature elements using a feed-forward and feed-backward mechanism.

113. The device of claim 19, wherein the processor identifies the character by combining recognized quadrature elements of the character and comparing the combined recognized quadrature elements with a reference set of quadrature data.

114. The device of claim 27, wherein the processor identifies the character by combining recognized quadrature elements of the character and comparing the combined recognized quadrature elements with a reference set of quadrature data.

115. The device of claim 19, wherein the processor identifies the character by comparing a recognized quadrature element with a reference set of quadrature data.

116. The device of claim 27, wherein the processor identifies the character by comparing a recognized quadrature element with a reference set of quadrature data.

117. The device of claim 99, wherein the processor comprises a first processor for characterizing each detected stroke as a quadrature element using a set of reference quadrature elements, and a second processor for identifying the character, the first and second processor functioning asynchronously.

118. The device of claim 100, wherein the processor comprises a first processor for characterizing each detected stroke as a quadrature element using a set of reference

quadrature elements, and a second processor for identifying the character, the first and second processor functioning asynchronously.

119. The device of claim 19, wherein the processor characterizes each detected stroke as a quadrature element as one in a set of reference quadrature elements by representing each detected stroke as a quadrature element selected from the group consisting of: a basis vector, eigenvector, polynomial, Fast Fourier Transform function, and a combination of vector data and function translations.

120. The device of claim 27, wherein the processor characterizes each detected stroke as a quadrature element as one in a set of reference quadrature elements by representing each detected stroke as a quadrature element selected from the group consisting of: a basis vector, eigenvector, polynomial, Fast Fourier Transform function, and a combination of vector data and function translations.

121. The device of claim 19 further comprising a character storage mechanism for storing a signal representing the character.

122. The device of claim 27 further comprising a character storage mechanism for storing a signal representing the character.

Allowable Subject Matter

2. Claims 1-8, 19-35, 38-45, 73-77, 81, 85-90, and 97-122, (renumbered as 1-71) are allowed.

3. The following is an examiner's statement of reasons for allowance:
Per the applicants approve amendments and the arguments filled 8/19/2004 pages 18-20, all the claims have been allowed.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vikkram Bali whose telephone number is 703.305.4510. The examiner can normally be reached on 7:30 AM - 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on 703.308.6604. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Vikkram Bali
Primary Examiner
Art Unit 2623

vb
February 4, 2005